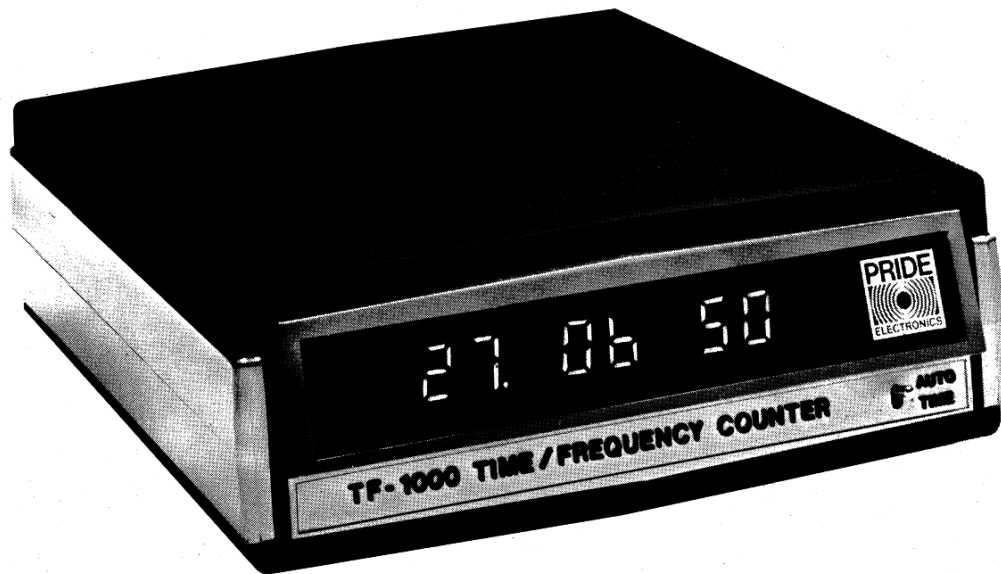


TF-1000

Instruction Manual



Time \ Frequency Counter

PRIDE ELECTRONICS

Carlsbad, California 92008 (714) 438-2805

<http://www.cbtricks.com>

PRIDE TF-1000 TIME/FREQUENCY COUNTER

CONGRATULATIONS! You are now the proud owner of a Pride TF-1000 combination time and frequency counting instrument - a unique concept in personal radio station accessories. Your TF-1000 has been engineered with the latest in integrated circuitry - LSI (large scale integration) - which allows higher density packaging and greatly increased reliability over the hundreds of discrete components required to do the same job. Assembled to exacting standards by the latest manufacturing techniques, your TF-1000 should give you many years of trouble free service.

The TF-1000 provides you, the operator, with a large, well defined 6 digit LED readout which normally displays time. You may select either a 12 or 24 hour time display format. Back panel switches allow stepping the hours or minutes to correctly set time and a hold function for accurate synchronization with WWV, etc. When the unit is connected to the station antenna system and the transmitter keyed, the display will automatically switch to the counter mode and the frequency of the carrier is displayed. When the carrier is turned off, the display will automatically switch back to the time mode. If you desire only the time display, the front panel switch may be placed in the "time" position, which locks the unit in the time mode, regardless of transmitter operation.

Front Panel:

Auto-Time Switch: In the time position will hold the unit in time mode, irrespective of transmitter operation; in the auto position will allow unit to switch to frequency count mode when carrier is present.

Rear Panel:

Time Set Controls-- Fast: Advances hours digit rapidly.
Slow: Advances minutes digit rapidly.
Hold: Stops clock count for synchronizing with correct time.

12/24 HR -- Allows choice of 12 or 24 hour display.

25W/250W -- Chooses the power level at which the counter will operate. Use the 25W position for transmitters in the 1 to 25 watt power range, and the 250 watt position for transmitters in the 25 to 250 watt power range. Although the unit will tolerate some overload, it is not advisable to exceed the power ratings unnecessarily.

- Fuse -- The fuse should only be replaced with a .5 amp 3AG type fuse.
- RF Connections -- Antenna connections are made with standard SO-239 type coaxial connections.

Specifications:

GENERAL

Rugged construction - high impact plastic case - glass epoxy circuit boards.
Large, six-digit readout for both clock and frequency counter functions.
Semi-conductor complement
2 LSI (large scale integration) IC's.
4 CMOS IC's .
2 Schottky TTL IC's.
1 voltage regulator IC.
23 silicon transistors.
2 silicon small signal diodes.
1 bridge rectifier.

CLOCK

Selectable 12 or 24 hour readout.
High accuracy line timebase.

FREQUENCY COUNTER

Frequency range - 1.8 to 40 MHz.
Better than $\pm .003\%$ accuracy.
Two power ranges:

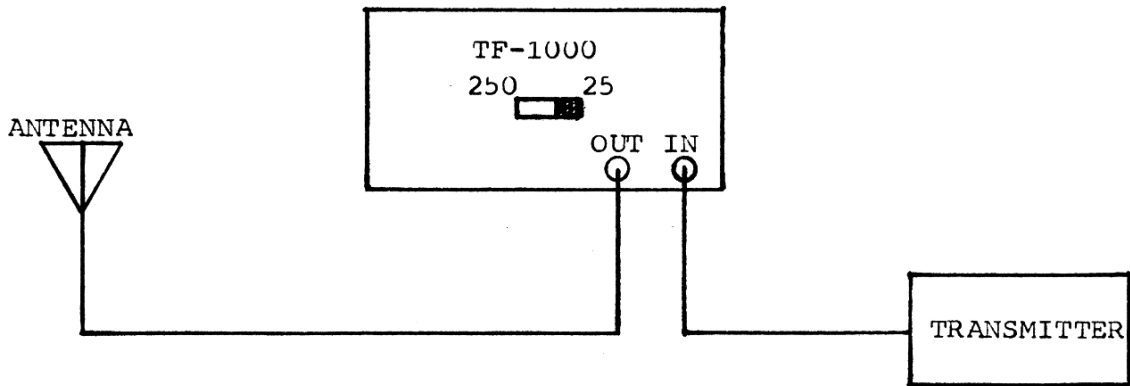
- 1) 2 to 25 watts
- 2) 25 to 250 watts

Automatic switching from clock to counter mode.
Negligible insertion loss on receive or transmit.
Six digit readout resolves down to nearest 100 Hz. ± 1 count.

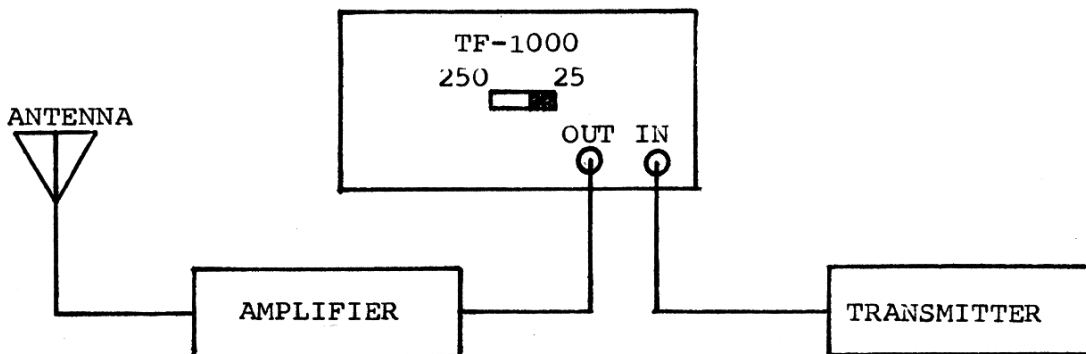
Installation:

The following information should be followed when installing the TF-1000.

The diagram on the following page illustrates installation of the TF-1000 in a station of 25 watts or less output. For output powers of more than 25 watts but less than 250 watts, place the back panel power level switch in the 250 watt position.



If your station utilizes an amplifier whose output is greater than 250 watts, the TF-1000 must be placed between the transmitter and amplifier. The power level switch must be placed in the position appropriate to your transmitter's output power.



Operation:

The most obvious feature of the TF-1000 is that there is no power switch on the unit. The TF-1000 must remain connected to the 117 VAC line at all times, as the clock derives its timing accuracy from the 60 Hz. line. In most areas the line frequency is very accurately controlled, so your clock will maintain correct time over long periods.

To set the clock, one needs first to select 12 or 24 hour operation with the red button located on the back panel. The hours and minutes can then be set by depressing the "fast" and "slow" advance buttons. The display must be advanced to just beyond actual time - then the "hold" button is depressed, holding the display constant until actual time matches that of the display. Releasing the "hold" button at the proper instant then lets the clock begin counting with time.

The operation of the frequency counter is completely automatic. The counter can be "locked-out", however, by placing the "time-auto" switch in the "time" position. This will keep the unit locked in the time display mode.

Several points about the operation of the TF-1000 might bear discussion. One is that the clock remains in operation even when the TF-1000 is being used as a frequency counter. The display is the only portion of the instrument that is switched between the counter and clock circuitry. Another thing is that in the frequency counter mode, the display will tend to "bobble" as the input signal is modulated. This factor is common to all frequency counters that are used without internal connections to a radio. The counter must have an unmodulated input signal for proper operation. This can be easily accomplished by several means. When using AM, depressing the "mic" button without talking will give an unmodulated carrier, and, when using SSB, a few watts of carrier injection without modulation will serve the purpose. If the display bobbling is bothersome, merely place the "time-auto" switch in the "time" position during periods of modulation.

Servicing:

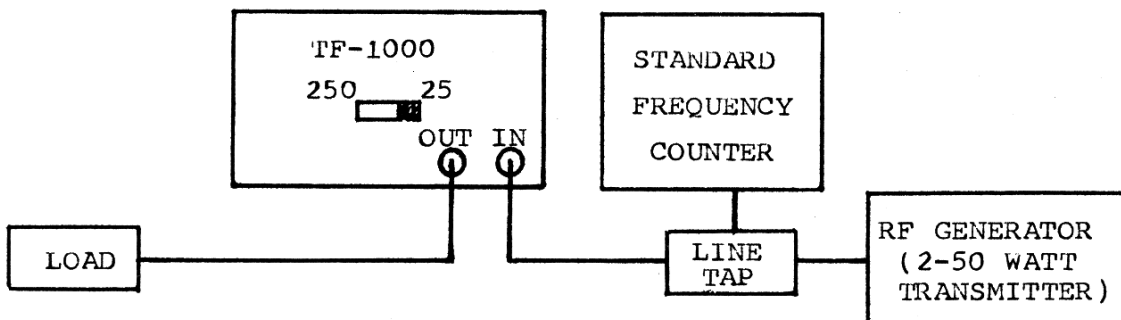
Servicing of this equipment should be referred to competent personnel only.

Recommended equipment:

- 1) DC-100 MHz. oscilloscope W/10 to 1 probe
- 2) Accurate frequency counter
- 3) RF exciter W/adjustable level of 2- 50 watts minimum
- 4) High quality voltmeter (VTVM, etc.)

The only servicing adjustment that should ever be needed would be a touch-up of the reference oscillator calibration for the frequency counter. This can be easily accomplished by the following method:

- 1) Connect an accurate frequency counter in line with a transmitter and the TF-1000.



- 2) Find the small access hole on the bottom of the TF-1000. The adjustment requires a small, flat blade alignment tool.
- 3) Apply enough drive power to make the TF-1000 switch into the frequency counter mode.
- 4) Adjust the TF-1000 alignment trimmer until the unit reads the same frequency as the other frequency counter.

NOTE:

It is best if this adjustment is done at the high frequency end of the range (25 -30 MHz.).

The following chip descriptions are supplied to aid the competent service technician should servicing ever become necessary. It would be helpful to follow the schematic diagram while studying the descriptions.

1) MM5314N

This IC is responsible for the clock portion of the TF-1000. Power connections are pin 12 (+12V), and pin 2 (ground). Pin 1 is the display output enable connection - this pin must be high for the chip to operate, and low for the display to blank. Pins 3 through 9 are the multiplexed segment drive outputs. Pin 10 is the 12/24 hour select input. This pin, when ungrounded, selects 24 hour operation. Grounding it through the switch on the back panel selects 12 hour operation. Pin 11 selects 50/60 Hz. operation. It is always grounded in circuit for 60 Hz. timebase. Pin 13, when grounded selects the "hold" function. Pin 14, when grounded selects the "slow" set function. Pin 15, when grounded selects the "fast" set function. Pin 16, is the AC time base input. The input signal must be filtered for spikes by an RC network, and must not exceed the supply voltage on peaks of the cycle. This is accomplished by clamping to the supply with a small signal diode. Pins 17 through 22 are the multiplexed digit drive outputs. Pin 23 is the multiplex oscillator speed connection - the speed is set by the RC time constant of the network connected to it. Pin 24 is the 4/6 digit readout select. Leaving this pin disconnected selects the 6 digit display mode. Grounding this pin would select a 4 digit display (hours and minutes only).

2) ICM7208

This chip is responsible for the frequency counter portion in the operation of the TF-1000. The 7208 is used in conjunction with the 7207 IC which supplies all the timing information necessary for proper counter operation. Pin 1 on the 7208 is the V_{DD} (+5VDC) connection. Pin 4 is the supply ground connection. Pins 2,3,15,17,18,26, and 28 are the multiplexed segment drive outputs.

Pins 5,6,10,21,22,24, and 25 are the multiplexed digit drive outputs. Pin 10's output (digit #7) is not used in this instrument. Pins 7, 23, and 27 are rapid advance control features which are not used in this instrument. Pin 8 has no internal connection. Pin 9 is the output enable connection. This pin must be low for the counter to function. Pins 11, 13, 14, and 19 are all timing inputs from the 7207. These should all be square wave signals with levels from 0 - 5 volts, approximately, peak to peak. Pin 12 is the input signal to be counted for display. Pins 16 and 20 are both timing inputs which are not used in this application.

3) The purpose if the 74S04 input chip is twofold - is to provide a squared input signal for the next chip and the other is to provide a buffered drive signal for the automatic switching circuitry.

4) The 74S196 IC is used as a divide by 10 stage before the input of the 7208 IC. This is so the 7208 can be run at a faster sampling rate, thus increasing the speed of display updating.

5) The heart of this instrument's dual-function ability is in the 4016 FET switch IC's. They allow the display to be switched between the digit drive outputs of the 7208 and th 5314. Only the digit drive outputs need to be switched - the segment drives of the 7208 and 5314 are paralleled.

The 4016 consists simply of four SPST switches, with control gates brought out to separate pins. Pin 14 is tied to the supply voltage (+12V), and pin 7 is connected to the supply ground. The inputs of the switches are on pins 1,4,8, and 11. The outputs are on pins 2,3, 9, and 10. The control gates are on pins 5,6,12,and 13. The control gates must be high for the switches to be on.

WARRANTY POLICY

The Pride TF-1000 is warrantied for a period of 90 days. This warranty is limited to repairing or replacing damaged parts and is void when the equipment has been misused, tampered with, or used contrary to instructions. Return under warranty must be sent to the factory pre-paid and be accompanied by a true copy of the sales receipt. Do not ship to factory without prior authorization. Factory will pre-pay return freight.

PARTS LIST FOR TF-1000

CAPACITORS:

| <u>Part Number:</u> | <u>Quantity:</u> | <u>Description:</u> |
|---------------------|------------------|----------------------------|
| 21-1390-00 | 1 | dipped mica 39 pf 5% DM-15 |
| 22-0107-00 | 1 | electrolytic, 100 uf 25V |
| 22-0108-00 | 1 | electrolytic, 1000 uf 25V |
| 22-0227-00 | 1 | electrolytic, 200-220 uf |
| 08-0102-00 | 1 | ceramic disk .001 uf 1 KV |
| 08-0103-01 | 1 | ceramic disk .01 50V gmV |
| 08-0103-02 | 2 | ceramic disk .01 uf 1 KV |
| 08-0104-02 | 5 | mylar .1 uf 100V |

RESISTORS:

| | | |
|------------|---|------------------------------|
| 06-0407-00 | 7 | carbon film 4.7 ohm 1/2 w 5% |
| 06-1002-00 | 4 | carbon film 1K 1/2 w 5% |
| 06-1003-00 | 8 | carbon film 10K 1/2 w 5% |
| 06-1004-00 | 1 | carbon film 100K 1/2 w 5% |
| 06-1201-00 | 8 | carbon film 120 ohm 1/2 w 5% |
| 06-1800-00 | 1 | carbon film 18 ohm 1/2 w 5% |
| 06-1802-01 | 1 | carbon comp 1.8K ohm 1 w 10% |
| 06-1803-00 | 1 | carbon film 180K 1/2 w 5% |
| 06-2201-00 | 1 | carbon film 220 ohm 1/2 w 5% |
| 06-4701-00 | 4 | carbon film 470 ohm 1/2 w 5% |
| 06-4702-02 | 1 | carbon film 4.7K 1/2 w 5% |
| 06-4703-00 | 1 | carbon film 47K 1/2 w 5% |
| 06-5601-00 | 1 | carbon film 560 ohm 1/2 w 5% |
| 06-6801-00 | 1 | carbon film 680 ohm 1/2 w 5% |
| 06-6803-00 | 1 | carbon film 68K 1/2 w 5% |

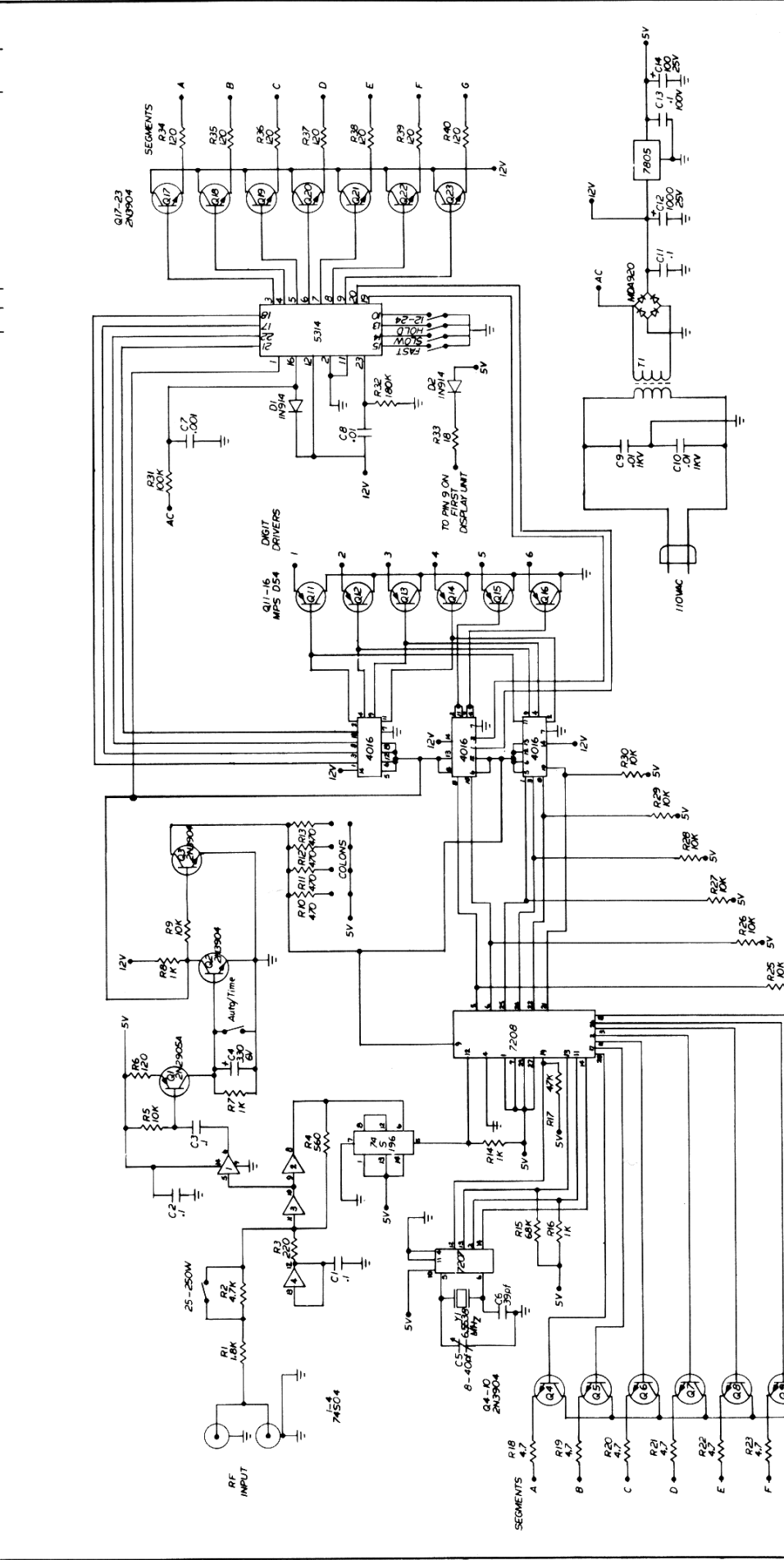
SEMI-CONDUCTORS:

| | | |
|------------|----|------------------------------------------|
| 48-0054-00 | 6 | transistor, PNP Darlington plastic |
| 48-0196-01 | 1 | integrated circuit, Schottky decade cntr |
| 48-0914-00 | 2 | diode, signal 1N914 |
| 48-0920-00 | 1 | rectifier, bridge |
| 48-2905-00 | 1 | transistor, PNP Si switching |
| 48-3904-00 | 16 | transistor, Si NPN switching |
| 48-4016-02 | 3 | integrated circuit, quad CMOS analog sw |
| 48-5314-02 | 1 | integrated circuit, LSI clock |
| 48-7207-02 | 1 | integrated circuit, clock-generator |
| 48-7208-02 | 1 | integrated circuit, counter/driver |
| 48-7404-01 | 1 | integrated circuit, Schottky hex inv |
| 48-7805-00 | 1 | integrated circuit, regulator 5VDC 1A |
| 49-0728-00 | 3 | display, 7-segment common cathode |
| 49-5022-00 | 4 | LED, red pinpoint |
| 49-5024-00 | 1 | LED, red diffused |

MISCELLANEOUS:

| <u>Part Number:</u> | <u>Quantity:</u> | <u>Description:</u> |
|---------------------|------------------|----------------------------------|
| 05-0005-00 | 1 | bushing, strain relief |
| 09-0239-00 | 2 | receptacle, coaxial |
| 09-0410-50- | 13 | terminal, pin tin plated |
| 09-1204-50 | 16 | terminal, socket tin plated |
| 09-3101-00 | 2 | connector, right angle 10 pin |
| 09-8314-00 | 6 | socket, IC 14 pin solder |
| 09-8324-00 | 1 | socket, IC 24 pin solder |
| 09-8328-00 | 1 | socket, IC 28 pin solder |
| 20-0404-00 | 1 | trimmer, P.C. comp mica 4-60 pf |
| 25-0500-00 | 1 | transformer, 12V 500MA |
| 28-0120-00 | 1 | cord, AC line, 6 feet |
| 28-1109-00 | 2 | connector, wafer 10 pin |
| 40-0102-00 | 1 | switch, min, SPDT |
| 40-0515-00 | 1 | switch, slide SPST |
| 40-1000-00 | 1 | switch, button assy |
| 47-1000-00 | 1 | crystal KC18/U 6.5536 KHz. .001% |
| 65-0025-00 | 1 | fuse, slow blow 1/4 A |
| 67-1200-00 | 1 | fuse, extractor post |
| 75-2193-00 | 4 | feet, rubber |
| 82-1000-01 | 1 | PCB, TF-1000 main |
| 82-1000-02 | 1 | display board TF-1000 |
| 84-1000-00 | 1 | case assy TF-1000 |
| 85-1000-05 | 1 | panel, rear complete |
| 85-1000-06 | 1 | bracket, transformer |
| 85-1000-07 | 1 | nut, switch, plate |

| REV | DATE | DESCRIPTION | APPROVED |
|-----|------|-------------|----------|
| 1 | | | |



| REVISIONS | | DATE | | APPROVED | |
|-----------|-------------|------|-------------|----------|-------------|
| NO. | DESCRIPTION | DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | | | |

| PARTS LIST | | CONTRACT NO. | |
|------------|-------------|--------------|-------------|
| QTY | DESCRIPTION | NO. | DESCRIPTION |
| | | | |

| PRIDE ELECTRONICS | |
|------------------------|-----------|
| SCHEMATIC | |
| TF-1000 | |
| TIME FREQUENCY COUNTER | |
| DATE | ISSUE NO. |
| 9-1-76 | 1 |
| DESIGNED | C.E.V. |
| CHECKED | J.E.S. |
| APPROVED | J.E.S. |
| DATE | |
| 9-1-76 | |

| UNLESS OTHERWISE SPECIFIED | |
|----------------------------|------|
| TOLERANCES ARE: | |
| RESISTORS | ± 5% |
| CAPACITORS | ± 5% |
| MATERIAL | |
| | |
| FINISH | |
| | |

| SCALE | DO NOT SCALE DRAWING | USED ON | APPLICATION |
|-------|----------------------|---------|-------------|
| D 83 | | | |

| SIZE | DATE | APPROVED |
|------|------|----------|
| | | |